

amount of emission given off. The methods used to measure the effect of a project on the ambient air quality depend on the location of the project and the pollutants to be considered. The air quality impact of highway projects in rural areas can be assessed using simplified procedures. Projects in urban non-attainment areas can require very detailed analysis. The US 17 project area is located in rural attainment area, thus, a more complex urban analysis is not required. Results of the air quality analysis are presented in Section 4.1.3.2 in Chapter 4; a summary of key pollutants is presented below.

### *3.3.2.1 Carbon Monoxide*

Carbon monoxide is the primary pollutant emitted by automobiles. Automobiles are considered to be the primary source of CO pollution in the project area. Therefore, the focus of the 2001 air quality analysis was on carbon monoxide levels.

Two sources are needed to determine CO levels at a particular point near a highway: local and background. The local CO source is emitted from cars operating on roads near the receptor (within 325 feet). The background source is due to CO emissions from cars operating on roads farther than 325 feet away from the receptor. The one-hour background source used is an area-wide average of 1.8 parts per million (ppm), developed by the NCDENR Division of Air Quality (DAQ). The eight-hour background source used is 1.1 ppm, determined by multiplying the one-hour background source CO concentration by the persistence factor of 0.60 (NCDENR DAQ, 1995: pg. 54). The local CO concentrations were determined using line-source computer modeling. Results of CO modeling are discussed in Chapter 4.

### *3.3.2.2 Hydrocarbons and Nitrogen Oxides*

Automobiles are generally regarded as considerable sources of nitrogen oxides (NOs) and hydrocarbons (HCs). Nitrogen oxides and hydrocarbons are carried into the atmosphere where they react with sunlight to form nitrogen dioxide (NO<sub>2</sub>) and ozone (O<sub>3</sub>). The photochemical reactions that form O<sub>3</sub> and NO<sub>2</sub> require several hours to occur. For this reason, the peak levels of O<sub>3</sub> generally occur six to 13 miles downwind of the source of HC emissions. Urban areas as a whole are regarded as sources of HCs rather than individual streets and highways. There are no large urban areas within at least 10 miles of the study area. Jones and Onslow counties are in attainment for O<sub>3</sub> and NO<sub>2</sub>.

### *3.3.2.3 Particulate Matter and Sulfur Dioxide*

Automobiles are not generally regarded as significant sources of particulate matter and SO<sub>2</sub>. Nationwide, highway sources account for less than seven percent of particulate matter emissions and less than two percent of SO<sub>2</sub> emissions. Particulate matter and SO<sub>2</sub> emissions are